

FOR OFFICIAL USE ONLY

JPRS L/10065

22 October 1981

West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 12/81)



FOREIGN BROADCAST INFORMATION SERVICE

FOR OFFICIAL USE ONLY

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

COPYRIGHT LAWS AND REGULATIONS GOVERNING OWNERSHIP OF MATERIALS REPRODUCED HEREIN REQUIRE THAT DISSEMINATION OF THIS PUBLICATION BE RESTRICTED FOR OFFICIAL USE ONLY.

FOR OFFICIAL USE ONLY

JPRS L/10065

22 October 1981

WEST EUROPE REPORT
SCIENCE AND TECHNOLOGY
(FOUO 12/81)

CONTENTS

CHEMICALS

Briefs

Carbon Fiber Plant in France	1
Composite-Material Bridge Construction	1

INDUSTRIAL TECHNOLOGY

Italian Industrial Robotics Analyzed (LE PROGRES SCIENTIFIQUE, Mar-Apr 81)	2
---	---

Unmanned Shop Operating at Volkswagen (VDI-Z, No 12, 1981)	9
---	---

Briefs

New Development in EDM	10
------------------------	----

TRANSPORTATION

Differences of Opinion on MDF 100 Project (AIR & COSMOS, 29 Aug 81)	11
--	----

- a -

[III - WE - 15] S&T FOUO]

FOR OFFICIAL USE ONLY

CHEMICALS

BRIEFS

CARBON FIBER PLANT IN FRANCE--ELF-Aquitaine has just concluded an agreement with Toray Industries (Japan) and Union Carbide (United States) to engage in a joint "construction and location study for a carbon fiber production unit in France." This news thus confirms the ELF-Aquitaine group's development plan relating to high-performance composite materials, a plan examined in detail in AIR & COSMOS No 860 p 38. Though the wording of the agreement remains cautious (referring only to a study), it nonetheless remains that an important hurdle has just been cleared by the ELF-Aquitaine group, in that on one hand these studies will now be carried out in a concrete framework of cooperation, with involvement of the world leader in this type of material (Toray), and on the other hand this agreement, together with the one concluded with SEP [European Propellant Company], places the ELF-Aquitaine group in the position of leader in the eyes of the government authorities, particularly GIMAC [Interministerial Group for Composite Materials] (AIR & COSMOS No 866 p 28). For the sake of completeness, we should mention that Toray and Union Carbide have already concluded an agreement for cooperation in setting up a production plant in the United States using the Toray processes. The agreement with ELF-Aquitaine will thus create a world triangle of interests covering the world's three great fiber consumer centers: Japan, Europe, and North America. [Text] [Paris AIR & COSMOS in French 29 Aug 81 p 9] [COPYRIGHT: A. & C. 1980] 9828

COMPOSITE-MATERIAL BRIDGE CONSTRUCTION--Under the title "Project: Polystal®" Bayer Reports write: "Ferroconcrete, stressed steel--who would not associate these ideas with the highest quality concerning strength, load-carrying ability and resistance to weathering? But even here corrosion damage cannot be excluded...." The report goes on to say that Strabag AG in Duesseldorf has built a stressed-concrete bridge in which fiberglass-reinforced material has replaced steel, and expectations are that the bridge will confirm the suitability of the new building material in a long-term test. The project received financial support from the Ministry for Research and Technology. Further areas of application for Polystal are mentioned: ropes for masts (up to 30 ms), lines for pulling underground cables, sections for plastic-covered greenhouses, tent roof designs, etc. It is interesting to note how Bayer has skillfully patented the concept "Polystal" by avoiding the correct spelling of the word "Stahl" steel. (A practice long current in English-speaking countries.) The intention, as can easily be deduced, is to use steel's good reputation to improve sales of artificial materials. [Text] [Duesseldorf STAHL UND EISEN in German 27 Jul 81 p 56] [COPYRIGHT: 1981 Verlag Stahleisen mbH, Duesseldorf] 9581

CSO: 3102/406

1

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

INDUSTRIAL TECHNOLOGY

ITALIAN INDUSTRIAL ROBOTICS ANALYZED

Paris LE PROGRES SCIENTIFIQUE in French Mar-Apr 81 pp 45-49

[Article by the French Embassy in Rome]

After having reached within a few years, a respectable position in the machine tool sector--Italy currently being the fifth largest producer and third largest exporter in the world--robotics is an area in which the dynamism and enterprising spirit of Italian producers should become evident in the future.

Italian robot builders, whose number has tripled in less than 10 years, enjoy a rapidly expanding market which they have regained before successfully undertaking exportation by means which have often been original and highly technical.

The Industrial Robot Market

The development of the Italian industrial robotics market has been very sustained during the last five years, with an average annual growth rate of 62.6 percent in numbers of robots, and 131.2 percent in value, while exportation expanded at a rate of 68.1 percent per year in numbers, and 151.6 percent in value.

During these last years we have thus witnessed a true retrieval of the domestic market on the part of Italian robot producers, since the trade balance in this domain has moved from a negative figure in 1977 (-5 billion lire) to a positive one of 5 billion lire in 1979.

The Robot Industry

Whereas there were only four builders in 1972, thirteen enterprises are currently producing robots in Italy; with the exception of Olivetti-Osai whose plants are located in Mezzogiorno near Caserta, all the other companies are installed in the industrial north.

Robot producers can be classified into three major categories:

Subsidiaries of large user enterprises, Comau for Fiat and Osai for Olivetti;

FOR OFFICIAL USE ONLY

Table 1. Development of industrial robot market in Italy from 1975 to 1979.

Quantity (number of units)	1975	1976	1977	1978	1979	Average annual development in 1975-1979 (%)
Production	60	120	160	270	420	62.6
Importation	40	60	120	40	40	--
Exportation	20	30	60	90	160	68.1
Apparent consumption	80	150	220	220	300	39.2
Value (billion lire)						
Production	0.7	4.0	5.7	11.3	20.0	131.2
Importation	1.8	2.8	6.4	2.2	2.3	6.3
Exportation	0.2	0.4	1.5	3.1	7.8	151.6
Apparent consumption	2.3	6.4	10.6	10.4	14.5	39.4

Table 2. Italian industrial robot market in 1979, by categories (number of units and billion lire).

	Assembly		Painting		Welding		Handling	
	Number	Value	Number	Value	Number	Value	Number	Value
Production	33	4.8	73	6.4	40	3.8	274	5.0
Importation	--	--	6	0.7	--	--	34	1.6
Exportation	16	2.4	48	2.9	12	1.2	84	1.3
Apparent consumption	17	2.4	31	4.2	28	2.6	224	5.3

Medium-size enterprises which have traditionally manufactured measurement instruments or fixed welding and painting stations, and which have diversified into robotics, such as Basfer, Caiotto, Dea, Elfin, Bisiach e Carru, and Marin;

And small, recently created "artisan" enterprises specializing in robotics, such as Norda, Aisa, Camel, Jobs, and Sls.

Some of them have specific characteristics. Comau for instance, supplies integrated systems intended to automate complete production cycles (welding, painting, and so on), and focuses on flexibility: Robogate, Robocarriers, and flexible transfer and machining lines.

On the other hand, Norda mass produces simple medium-size and small servo arms, while Jobs manufactures servo arms for machine tools on the principle of automation islands.

As a rule, robots are produced in small lots just like machine tools, in assembly units which group a limited number of highly qualified employees.

Table 3 shows the 1979 standing of each Italian industrial robot producer.

FOR OFFICIAL USE ONLY

Table 3. Relative size of Italian robot producers in 1979 (%).

	Number of units produced: 420	Value: 20 billion lire
Basfer	15.7	28.0
Olivetti-Osai	7.1	22.5
Norda	54.8	17.5
Comau	7.6	16.0
Gaiotto	1.7	4.0
Camel	3.6	2.5
Alsa	3.6	2.5
Bislaach et Carru	1.4	2.0
Sls	2.8	2.0
Dea	0.7	1.5
Elfin	0.5	1.0
Marin	0.5	0.5

Table 4. Italian robot exporters in 1979 (%).

	Number of units exported: 160	Value: 7.8 billion lire
Basfer	30.0	37.2
Olivetti-Osai	9.4	29.5
Norda	52.5	16.6
Comau	7.5	15.4
Dea	0.6	1.3

As we have seen, the Italian robot production has undergone a spectacular development during the last few years (annual average of 62.6 percent), with a large portion of this equipment being exported. During 1979, of the 420 robots produced (20 billion lire), 160 were exported (7.8 billion lire) as shown in table 4.

Inventory

Depending on the source, figures on the number of industrial robots installed in Italy vary greatly. The Italian Society for Industrial Robotics (SIRI) counted 353 in 1980, while the Federation of Scientific and Technical Associations (FAST) shows the number to be 750.

According to a FAST study, which appears to use a broader definition of robots, more than one-half of that figure is represented by servo arms for feeding and unloading pressure-molding machines.

Spray-painting robots represent 12 percent of the installed inventory; the Basfer Company of Monza is only second to Trallfa in Europe. Spot welding, used mainly in the automotive industry, represents 16 percent of the installed robots. It should be noted that in this field the Italian technology is different from that used in the United States and Japan (continuous welding).

FOR OFFICIAL USE ONLY

Table 5. Utilization of robots in Italy in 1979 (%).

By technical application:

Loading and unloading of pressure molding machines	53
Spot welding	16
Spray painting	12
Mechanical, electrical, and electronic assembly	9
Handling	7
Control measurements	3

By destination sector:

Automotive	28
Electric household appliances	8
Metal construction	8
Electronics	6
Rubber industry	1
Exportation	49

The use of assembly robots is still limited and concentrates mainly on electronic components (Sigma-Osai) and on small electromechanical ones (Pragma-Dea).

The utilization of robots in Italy developed primarily in the automotive industry, and especially at Fiat, which together with Volvo, appears to be the largest European user of robots.

However, while Volvo has recently ordered some one hundred Cincinnati robots, Fiat uses more than 200, or approximately as many as General Motors, for a production which represents one-quarter that of the American company. Moreover, the proportion of its own robots (notably Polar 6000 and Comau to the detriment of Unimation) is constantly growing, and the success encountered by these robots abroad, notably in Sweden (Volvo 242 and 244 production) and the United States (Chrysler Horizon) merits attention.

The pursuit of an ever greater automation of the production cycle has led Fiat to perfect for the past two years the Robogate system, which is very advanced in its integration and flexibility, allowing as it does the assembly of several different models on a single production line.

Three Robogate systems are presently operating at Fiat in the Rivolta, Cassino, and Termini Imerese plants; two others have been installed at Seat and five at Chrysler.

The introduction of robots at Fiat, which began in 1972 on the assembly line for the 132 (20 robots), reflects the company's interest in reducing production costs (but the economic efficiency of installations as complex as Robogate remains to be demonstrated) and in improving working conditions, especially in particularly sensitive production areas: rigidity of welding stations, toxic paint vapors.

FOR OFFICIAL USE ONLY

Table 6. Geographic distribution of countries which supply components to Italian producers of industrial robots (% - 1979).

	Italy	USA	CEE
Mechanical parts	100	--	--
Electronic control systems	60	40	--
Motors	80	15	5
Basic microprocessors	50	30	20
Grasping devices	90	--	--
Special devices	50	30	20
Mini and microcomputers used with robots	40	50	10

Table 7. Changes in component costs with respect to total cost in robot manufacturing (%).

	1980	1985
Mechanical parts	15	10
Electronic parts	15	15
Motor devices	20	15
Recognition and visualization devices	5	15
Sensors	15	25
Mini and microcomputers used with robots	30	20

Fiat currently uses 200 robots for welding, 75 of them in the production of Ritmo alone (Unimation and Polar 6000). The paint shops use some thirty arms (Trallfa-Basfer), but Fiat's objective is to fully robotize this area of production in which employees no longer want to work.

This concern for improving working conditions through elimination of repetitive, physically demanding, and dangerous jobs, meets with the unions' approval.

About 25 robots are operating at Alfa Romeo (foundry, forging, welding, painting). Some thirty should be installed during 1980-1981, and about one hundred in the next five years, but the recent Alfa-Nissan agreement will probably change these forecasts (undoubtedly toward more robotization?).

In general, we note that if the Italian automotive industry makes a rather broad use of robots for welding and painting, the introduction of robots in mechanical assembly operations which require speed and accuracy is still limited, and even experimental.

We will mention the case of Alfa Romeo, which uses an Olivetti-Osai Sigma robot to insert engine stud bolts under satisfactory economic conditions, since the installation was amortized in one and one-half years when two to three years are generally the rule. According to specialists, the final assembly of cars appears to be rather difficult to robotize because it would require highly sophisticated machines. Research is nevertheless in progress at the Fiat Research Center for the development of a robot-TV-computer system capable of defining the center of gravity of a part which the arm would have to grasp within a rather large space.

FOR OFFICIAL USE ONLY

Evaluation and Development Prospects

It would thus appear that the Italian approach to robotics differs rather significantly from that of other industrialized countries, where robot production is in general a diversification operation on the part of large and medium-sized enterprises which produce investment goods. Their objectives are consequently primarily quantitative and result in an effort toward standardization and mass production. In Italy, the development is based mostly on new applications and quality objectives, starting with robots produced in small lots (except for Norda). As in the case of machine tools, the Italian enterprises have opted to focus on just a few areas, by proposing solutions which meet as well as possible the needs of users, and which are capable of adapting to changes in their demands. During the last few years, we have thus witnessed the creation of many new companies which live on very specific products.

As a rule, therefore, the Italian producers conduct almost no basic research, but rather devote their efforts to development research, notably to sensor improvement (optical, acoustical, touch) and to the performance of microprocessors, which must be capable of responding to very diversified situations.

Particular care is also devoted to the preliminary installation of robots in industrial units, and to their placement in operation, which can amount up to 50 percent of the cost of the installation.

Results have been rather spectacular, since in very short order the Italian industry has been able to recover its fully expanding domestic market, as well as use often original solutions to gain a strong position in exportation (Robogate and Polar 6000 of Comau, handling arms from Norda, Sigma Olivetti for assembly, Basfer painting robots, and so on). Significant in this respect are the examples of DEA, world leader in measurement instruments, who has just turned over to General Electric the license for its Pragma assembly robot, or the interest shown in Italian builders--such as Jobs--by the British company Fairey, or still, the agreements signed to develop joint research.

As for the future, the prospects for industrial reconversion and restructuring in Italy (Law 675) lead us to think that the robotics and industrial automation market will continue to grow in years to come at a particularly high rate, a growth from which the Italian robot producers will be the first to benefit.

Moreover, even though up to now the government aid from a special fund for applied research managed by Istituto Mobiliare Italiano (IMI) has been almost negligible in this sector, it is not excluded that as part of the sector plans that are being formulated, the government will show more future interest in exploiting the unquestionable trump cards which it is holding. If this were not so, there remains no doubt that as soon as their products become old, the small robot producers would risk becoming victims of their narrow specialization policy, of their weak financial standing for investment, and of the limited means devoted to research.

And finally, as can be seen from table 6, it appears that the Italian producers depend strongly on foreign suppliers for components, and especially for sensitive sub-assemblies, a condition which makes them somewhat vulnerable.

7
FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

Yet, the sophisticated components (recognition and visualization devices, sensors, and so on) whose development is still in the basic research field, are asked to play a fundamental role in the intelligence of future robots, and will thus increasingly affect their construction costs.

It can be estimated however that the innovative capability of enterprises and their trade dynamism, the forthcoming restructuring of the public and private electronic industry, and the desire of the government to promote certain strategic areas through sector plans (electronics, automotive, components, and so on) and to aid research, are all trump cards which should allow the Italian industry to not only free itself from foreign dependence for sub-assemblies, as they have been able to do for robots during recent years, but also to further assert themselves on the domestic and foreign markets.

COPYRIGHT: D.G.R.S.T., Paris, 1981

11,023
CSO: 3102/416

FOR OFFICIAL USE ONLY

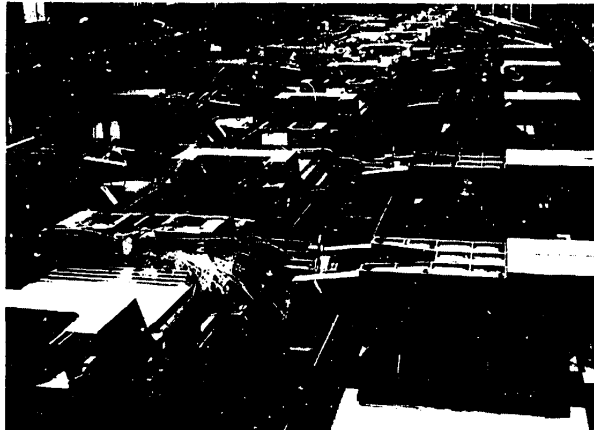
FOR OFFICIAL USE ONLY

INDUSTRIAL TECHNOLOGY

UNMANNED SHOP OPERATING AT VOLKSWAGEN

Duesseldorf VDI-Z in German No 12, 1981 p XIV

[Text]



The "unmanned" workshop, brought from Japan to Europe almost as a legend, is preparing to expand its foothold in this country as well. This picture is not a look into the assembly shop of a Japanese automobile manufacturer, it is a reproduction of reality in the Hannover Volkswagen plant. It shows the newly installed production line with automated handling machines, which are taking over operations in van and pickup truck assembly that previously had to be carried out by humans, requiring great physical effort. At the same time, robot assembly offers the desired effect of great flexibility in program control and increasing the speed of production, in sum, therefore, of lowering costs.

COPYRIGHT: VDI-Verlag GmbH, Duesseldorf 1981

9581

CSO: 3102/406

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

INDUSTRIAL TECHNOLOGY

BRIEFS

NEW DEVELOPMENTS IN EDM--The recently achieved removal level of 70-90 mm²/min means such an increase in economy that with these figures wire discharge could be of interest to users who have so far remained skeptical about this technology. If, about 7 years ago, removal levels of 20 mm²/min were felt to be "quick," discharge levels of 4 X 20 mm²/min are already being achieved today. Intensive research and constant exchange of information with users led to the development of a new type of electrode. Specially tuned to one generator stage, this "hot" wire utilizes physical principles previously overlooked. The result is an increase in performance of 50 to 80 percent compared with traditional brass-wire technology. An additional increase in output is expected from a new wire insertion device. It is said to enable unsupervised 24-hour wire discharge. Even wire insertion into conical sections is possible using this system. [Text] [Duesseldorf STAHL UND EISEN in German. 27 Jul 81 p 56] [COPYRIGHT: 1981 Verlag Stahleisen mbH, Duesseldorf] 9581

CSO: 3102/406

FOR OFFICIAL USE ONLY

TRANSPORTATION

DIFFERENCES OF OPINION ON MDF 100 PROJECT

Paris AIR & COSMOS in French 29 Aug 81 p 8

[Article: "MDF 100 Project: Differences of Opinion"]

[Text] At the end of last month [July] the Netherlands press took stock of differences of opinion between Fokker and McDonnell Douglas on the MDF 100 project. The two manufacturers, handling different projects (the F 29 and the DC-11), initially chalked up differences of opinion on 180 points. At the end of last month their points of view still disagreed on 70 points, including the design capacity for the new aircraft. Fokker would prefer to start from the basis of an airplane with 130 seats and a single aisle, which does not agree with the McDonnell Douglas concept. The two manufacturers have therefore decided to approach the airlines to obtain their reactions: McDonnell Douglas is in contact with United and Delta in particular, while Fokker is consulting KLM in particular. The two manufacturers hope that around November they will be able to arrive at complete integration of their respective points of view. Thus the effective launching of the MDF 100 project will depend essentially on market reactions.

Our correspondent in Tokyo indicates that in Japanese aeronautic circles Boeing is still considered the manufacturer favored for a cooperative program to build a 150-seat plane. It is speculated that the conditions offered by McDonnell Douglas and Fokker could elicit even more attractive offers from Boeing, and the next arrival of a delegation from Boeing is awaited. The Minister of Industry and Foreign Trade affirms that so far nothing is set concerning Japan's participation in a cooperative program to build a short- to medium-range 150-seat plane.

COPYRIGHT: A. & C. 1980

9828

CSO: 3102/421

END